

AMENDMENTS TO THE CLAIMS

1 (currently amended) A computer aided design system comprising:

a point sequence information extraction device which extracts a plurality of point sequences on a curved surface;

a dividing device which generates a curved surface from said point sequences using another computer aided design system, and divides said curved surface into a mesh having a predetermined number of mesh points~~meshes~~;

a first fundamental form computing device for computing coefficients of ~~at the first~~ fundamental form at a mesh point of said mesh, said coefficients of the first fundamental form being defined at said mesh point by a first tangent vector and a second tangent vector which define~~forms~~ a tangent plane of said mesh at said mesh point;

a second fundamental form computing device for computing coefficients of ~~at the second~~ fundamental form at said mesh point, said coefficients of the second fundamental form being defined at said mesh point by a said tangent vector in said tangent plane at said mesh point and a normal vector of said mesh at said mesh point; and

a memory device which stores said point sequence information, said coefficients of the first fundamental form and said coefficients of the second fundamental form.

2 (currently amended) ~~Said~~A computer aided design system according to claim 1, further comprising:

a principal curvature computing device which computes a principal curvature of said mesh point based on said coefficients of the first fundamental form and said coefficients of the second fundamental form;

a line of curvature computing device which computes a line of curvature showing a principal direction of said mesh based on said principal curvature;

a feature point/feature line analyzing device which extracts a point or a line which becomes~~become~~ a reference point or a reference line, respectively, of a transformation defined by changing patterns of one or more feature quantities among five feature quantities showing

features of said curved surface, said five feature quantities comprising a Gaussian curvature and a mean curvature computed based on said principal curvature, said principal direction, said line of curvature, and said coefficients of the first fundamental form and said coefficients of the second fundamental form; and

a girth length computing device which computes a girth length based on a curvature computed from said coefficients of the first fundamental form and said coefficients of the second fundamental form.

3 (currently amended) SaidA computer aided design system according to claim 2, further comprising:

a reproducing device which transforms said line of curvature for said girth length in said line of curvature direction, with said ~~feature point~~ or said feature line as said transformation reference point or reference line, respectively, and reproduces a shape of said mesh or said curved surface.

4 (currently amended) SaidA computer aided design system according to claim 3, further comprising:

a converting device which extracts a plurality of point sequences on a curved surface from said reproduced shape of said mesh or said curved surface, and converts said point sequences according to a graphical representation algorithm in another computer aided design system.

5 (currently amended) A computer aided design program stored in a computer-readable recording medium for ~~causing~~executing on a computer to execute:

a point sequence information extraction process for extracting a plurality of point sequences on a curved surface;

a dividing process for generating a curved surface from the~~said~~ point sequences using another computer aided design system, and dividing the~~said~~ curved surface into a mesh having a predetermined number of mesh points~~meshes~~;

a first fundamental form computing process for computing coefficients of ~~at~~ the first fundamental form at a mesh point of the mesh, the coefficients of the first fundamental form being defined at the mesh point by a first tangent vector and a second tangent vector which define forms a tangent plane of ~~the~~ said mesh at the mesh point;

a second fundamental form computing process for computing coefficients of ~~at~~ the second fundamental form at a mesh point of the mesh, the coefficients of the second fundamental form being defined at the mesh point by a said tangent vector in the tangent plane at the mesh point and a normal vector of ~~the~~ said mesh at the mesh point; and

a storage process for storing ~~the~~ said point sequence information, ~~the~~ said coefficients of the first fundamental form and ~~the~~ said coefficients of the second fundamental form.

6 (currently amended) Said A computer aided design program stored in a computer-readable recording medium according to claim 5, for further causing~~executing on a computer to execute:~~

a principal curvature computing process for computing a principal curvature of ~~the~~ said mesh based on ~~the~~ said coefficients of the first fundamental form and ~~the~~ coefficients of the second fundamental form;

a line of curvature computing process for computing a line of curvature showing a principal direction of ~~the~~ said mesh based on ~~the~~ said principal curvature;

a feature point/feature line analyzing process for extracting a point or a line which ~~becomes~~ become a reference point or a reference line, respectively, of a transformation defined by changing patterns of one or more feature quantities among five feature quantities showing features of said curved surface, the five feature quantities comprising a Gaussian curvature and a mean curvature computed based on said principal curvature, said principal direction, said line of curvature, and said coefficients of the first fundamental form and coefficients of the second fundamental form; and

a girth length computing process for computing a girth length based on a curvature computed from ~~the~~ said coefficients of the first fundamental form and ~~the~~ coefficients of the second fundamental form.

7 (currently amended) SaidA computer aided design program stored in a computer-readable recording medium according to claim 6, for further causing~~executing on~~ a computer to execute;

a reproducing process for transforming the~~said~~ line of curvature for the~~said~~ girth length in the~~said~~ line of curvature direction, with said ~~feature point or said feature~~ line as said transformation reference point or reference line, respectively, and reproducing a shape of said mesh or said curved surface.

8 (currently amended) SaidA computer aided design program stored in a computer-readable recording medium according to claim 7, for further causing~~executing on~~ a computer to execute;

a converting process for extracting a plurality of point sequences on a curved surface from the~~said~~ reproduced shape of the mesh or the curved surface, and converting the~~said~~ point sequences according to a graphical representation algorithm in another computer aided design system.

9 (currently amended) A computer graphics system comprising:

a point sequence information extraction device which extracts a plurality of point sequences on a curved surface;

a dividing device which generates a curved surface from said point sequences using another computer graphics system, and divides said curved surface into a mesh having a predetermined number of mesh points~~meshes~~;

a first fundamental form computing device for computing coefficients of at the first fundamental form at a mesh point of said mesh, said coefficients of the first fundamental form being defined at said mesh point by a first tangent vector and a second tangent vector which defineforms a tangent plane of said mesh at said mesh point;

a second fundamental form computing device for computing coefficients of at the second fundamental form at said mesh point, said coefficients of the second fundamental form being

defined at said mesh point by a said tangent vector in said tangent plane at said mesh point and a normal vector of said mesh at said mesh point; and

a memory device which stores said point sequence information, said coefficients of the first fundamental form and said coefficients of the second fundamental form.

10 (currently amended) A computer graphics program stored in a computer-readable recording medium for causing ~~executing on~~ a computer to execute:

a point sequence information extraction process for extracting a plurality of point sequences on a curved surface;

a dividing process for generating a curved surface from the said point sequences using another computer graphics system, and dividing the said curved surface into a mesh having a predetermined number of mesh points~~meshes~~;

a first fundamental form computing process for computing coefficients of a the first fundamental form at a mesh point of the mesh, the coefficients of the first fundamental form being defined at the mesh point by a first tangent vector and a second tangent vector which define~~forms~~ a tangent plane of the said mesh at the mesh point;

a second fundamental form computing process for computing coefficients of a the second fundamental form at the mesh point, the coefficients of the second fundamental form being defined at the mesh point by a said tangent vector in the tangent plane at the mesh point and a normal vector of the said mesh at the mesh point; and

a storage process for storing the said point sequence information, the said coefficients of the first fundamental form and the said coefficients of the second fundamental form.